UCRSF
2.8.2.1
4/2/10

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

April 2, 2010

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Reply To: ECL-111

Marko Adzic
Teck American Incorporated
501 North Riverpoint Boulevard, Suite 300
Spokane, Washington 99202

RE: EPA Comments on the March 2010 Methods Development QAPP

Dear Mr. Adzic:

This letter transmits EPA's comments on the Draft Quality Assurance Project Plan (QAPP) for Methods Development for Sediment Sampling and White Sturgeon Sediment Toxicity Studies, dated March, 2010. Under the terms of the June, 2006 Settlement Agreement between EPA and Teck American Incorporated (Teck), a revised version must be submitted to EPA within thirty (30) days of receipt of this letter. EPA is providing general comments in this letter. Additional comments are included in three separate attachments: a table of detailed comments, a map showing the sampling location for sturgeon methods development work, and text that provides examples of the level of detail EPA is expecting to see in the DQO section of the revised QAPP.

EPA is providing comments only on the sturgeon study components of the QAPP at this time. We are hereby directing Teck to separate this QAPP into two QAPPs - one focusing on sturgeon methods development, and the other focusing on sediment methods development – to be delivered at a date yet determined. At this time, Teck must prepare a revised QAPP that focuses only on methods development for sturgeon toxicity testing, and that is responsive to the comments provided with this letter. EPA comments on the sediment portions of the methods development QAPP will be submitted under separate cover at a later date. EPA is not establishing a deadline for submittal of a revised sediment methods development QAPP at this time.

The sturgeon methods development work will be conducted with sediment from Deadman's Eddy. See Attachment 2 for details.

The draft QAPP provides too little information regarding DQOs. The DQO process represents an essential element of the overall site investigation process and must be more completely described in the QAPP. Study questions and descriptions of how they will be

addressed need to be more complete and provided in greater detail. A description of how success will be determined for the various method development components is also needed. Additional details on DQOs are provided in Attachment 3.

Finally, the draft QAPP does not provide any mechanism for EPA review and approval of the results of the methods development studies. The revised QAPP must indicate that the results of the studies will be presented in a Technical Memorandum for EPA review and approval. In addition to study results, the Technical Memorandum must include recommendations for methods to be used in the toxicity testing. The issue of EPA approval was addressed in Teck's cover letter transmitting the draft QAPP, but it was not addressed in the QAPP itself. The revised QAPP must include a full discussion of how the results will be conveyed to EPA for approval and then incorporated into the QAPP for the definitive study.

With respect to cultural resource coordination, EPA has begun the cultural review and consultation process for the proposed polygon at Deadman's Eddy. EPA may have additional comments on Appendix B of the QAPP (Cultural Resources Coordination Plan). If so, these additional comments will be provided to Teck no later than April 14, 2010.

EPA would be happy to meet with you and your technical staff to ensure that the intent and meaning of our comments is clearly understood. It will benefit both the EPA and Teck if this QAPP can be revised and approved as quickly as possible so that field sampling is not delayed. We look forward to continued coordination with Teck on this issue.

Sincerely,

Helen H. Bottcher

Helen Bottcher
Project Manager

Attachments: Detailed Comments
Map
Example DQO language

cc: Dan Audet, U.S. Department of the Interior
Patti Bailey, Confederated Tribes of the Colville Reservation
Randy Connolly, Spokane Tribe of Indians
John Roland, Washington State Department of Ecology

ATTACHMENT 1

EPA Comments on the Sturgeon Studies Method Development Components of the March 2010 UCR Draft QAPP Methods Development for Sediment Sampling and White Sturgeon Sediment Toxicity Studies.

General Comments

Definitive Sturgeon Sediment Testing: EPA's understanding is that future studies to assess the potential for risks to sturgeon through sediment toxicity testing is not an objective of this QAPP and will be described under a different QAPP. Therefore, the present Sturgeon Sediment Toxicity Study Methods Development QAPP should clearly state this. Likewise, there should not be any references to "definitive" testing with sediments from locations sampled during the execution of this method development QAPP. As depicted in Attachment 2, the sturgeon methods development QAPP sampling in the U.S. will be conducted at Deadman's Eddy. Future sampling from other locations within the UCR site will occur under a separate QAPP.

DQOs: EPA is requiring DQO expansion and refinement for the DQOs for the methods development. DQOs are to be developed that will: 1) clearly guide any future modifications to the planned approach; and, 2) lead to a convergence of technical opinion on specific methods to employ in the future definitive studies. This method development QAPP document indicates that the USEPA DQO process will be used to guide the requirements and rationale for such activities. However, the DQOs presented in this document are not complete. Importantly, the DQOs do not describe how the results of studies will be evaluated to answer questions presented in the QAPP, or support decisions of the design of future studies in the UCR. For example, how will reported values be evaluated among test criteria? EPA has determined, for example, that *a priori* criteria need to be described on which to evaluate the successful performance of exposure chambers. Additional information describing the recommended DQOs is provided in Attachment 3.

Section A

Section	Page	Comment
A4	A1	The term "definitive study" is used throughout the document to describe a future study, planned for 2010, to evaluate sediment toxicity to white sturgeon as a part of the RI/FS. This is consistent with the language in EPA's Level of Effort Paper. However, the term confused some reviewers, because "definitive" implies that the future study will provide all the necessary information to make risk-management decisions. This may or may not be the case. Therefore, language should be added to the text to indicate that risk management decisions will not be made until the data are evaluated to ensure that DQOs for the overall risk assessment have been adequately addressed. Alternatively, the term "definitive" could be changed to "future toxicity testing" or other similar phrase.
A5	A2	EPA agrees that 0 to 6 inches is generally an appropriate representation of "surface sediments," but in the riverine portions of the site, including at Deadman's Eddy, erosion and redistribution

Section	Page	Comment
		may expose deeper sediments. At the approved sample collection area in Deadman's Eddy, it may be necessary to go deeper than 6 inches to obtain samples with varying grain sizes and proportions of slag. Collection efforts should target the top 6 inches, but may extend to a depth of no more than 12 inches. The final depth will have to be determined in the field and may vary depending on the subsample collection area within the polygon.
A5	A2	The appropriate depth for sediment in the sturgeon toxicity test chambers has not been set yet. Six inches (15cm) may be good to shoot for in this methods development, but references to "0-6 inches" should be replaced by "a target a depth of 6 inches for this evaluation." Reference should be made to the appropriate DQO relative to anticipated sediment depth needs.
A6	A-2	Contradictory information about the samples used for sturgeon methods development is presented here and elsewhere in the QAPP. This section indicates that off-site sediments will be used for sturgeon methods development while the next page (Section A7.1.1) indicates that on-site sediments will be used. Please clarify this text.
A6	A-2	The proposed studies represent method development, but are understood to be based on established general toxicity testing methods that are being modified for sturgeon. To increase our understanding of the bases for the work, please provide references to any such methods (e.g. ASTM standards or other standard protocols).
A7	A-3	The work to be performed under this methods development QAPP will provide important inputs on designing the definitive studies; however, it will not be applicable with regard to risk management decisions. Please clarify what is meant by "non-decisional" here and elsewhere as needed in the QAPP.
A7.1.1	A-3	The schedule indicates that it will take >30 days for sediments to reach steady state in the sturgeon exposure tanks – if sediments are introduced mid-May with testing in June/July. This may not be the case. Please qualify this statement by saying that the time to reach steady state will be determined as part of the method development studies and the schedule will be adjusted accordingly.
A7.2	A-3	The intended meaning and specific context for the terms "refined" and "calibrated" are not clearly presented. These terms should be clarified. If the work to be performed represents a refinement of previous tank chamber studies, references to these previous studies and relevant details should be provided, and the recognized shortcomings of any previous tank design scenarios can be summarized in the QAPP. It may be appropriate to reference another section where this information is provided.
A7.2	A-4	Another goal of the work is to find acceptable control sediments for the sturgeon bioassays. This will be accomplished by sampling and testing sediments upstream of the smelter in Trail. Please add a bullet to this section to make this clear. Finding appropriate control sediments is an important part of this effort, and needs to be described more fully in all the relevant parts of the document. Importantly, the revised QAPP must state clearly what tests will be

Section	Page	Comment
		run on potential control sediment samples, and what conditions will determine an acceptable location (e.g., the sediments should not be toxic to benthic organisms, should not be predicted to be toxic by sediment screening guidelines, etc.).
A7.3.2	A-5	The bullets in this section should be re-phrased as questions to be consistent with the topic description.
A7.3.2	A-5	In addition to simply reiterating the questions this study will address, a more detailed description of how the data will be collected, and used to answer the questions in Section A7.3.2, should be described. For example, what are the "potential gradients" that will be evaluated between porewater and the overlying water (second bullet), what parameters will be looked at for steady state between porewater and overlying water (third bullet), and what different substrates will be tested (fourth bullet). Please also provide a DQO relative to determining when steady-state is achieved what specific parameters will be used to make this determination, and what variability is acceptable.
A.7.4	A-6	This section should reflect revised sampling activities specifically intended to support the sturgeon toxicity test method development.
A7.5	A-6	This section indicates that Teck does not anticipate using statistics to evaluate the data collected under the pilot program. Since one of the objectives of this work is to evaluate the performance of various exposure chamber setups, more thought should be put into how such evaluations will be conducted and how the resultant data will be used to address the DQOs – please present this information in the revised QAPP. Please add to the last sentence of the first paragraph: "...although summary statistics and useful relationships between parameters will be presented (e.g., descriptions of time to steady state among different chamber setups and sediment types)."
A7.5	A-6	Please define what specific "chemical measures" will be evaluated and how precision will be determined, or refer to this information if presented in another section.
A7.7.2	A-10	Text in this section must be revised to describe the equipment (shovels, scoops) that will be used to collect material from the approved location in Deadman's Eddy. EPA's consultation with the cultural resource committee was limited to hand tools and the use of a van Veen grab or Eckman box core sampler is not permitted.
A7.7.2	A-11	Note that 10 cm should translate to 4 inches, not 4.5 inches.
A7.7.3	A-12	This section describes the objectives of the exposure chamber calibration work, but does not describe how this work will be performed. Therefore, more information is needed on how the studies will be designed and conducted to generate the information needed to refine the design of the exposure chambers. For example: will the porewater be removed from the system each time it is monitored, what percentage of the total pore water volume will be affected by each measurement of porewater? What will be the

Section	Page	Comment
		vertical distribution and number of samples collected (and for which parameters) to differentiate the chemical gradient between porewater and the overlying water column?
A7.7.3	A-12	Any available references supporting the proposed tank design layout (Figure A-1) should be provided. If the design was solely based on the experience and professional judgment of the laboratory scientists who will conduct this work, then that should be stated.
A7.7.3	A-12	Please also define the "basic water quality parameters" (bullet 2) that will be monitored and what criteria need to be met to achieve steady-state? The methods (e.g., sampling frequency) and performance criteria for determining when "calibration" or "optimization" has been achieved should also be described. Where appropriate, it would be helpful to know when evaluation criteria are based on other published methods that have been determined to provide acceptable data.
A7.7.3	A-12	This section should describe explicit contingency plans that would be followed in the event that "calibration" or "optimization" criteria are not met in time to begin work with sturgeon eggs this year. Please add text describing whether or not method developments would continue, and provide an estimate of the effect to the schedule for conducting the planned future testing.
A7.7.3	A-13	Please describe methods and criteria for identifying the effects of gravel on hydrological conditions in fluvial chambers. The approach for placing substrate should also be described so that it is understood to be reproducible between treatments. During method development there should be a control without this added substrate when evaluating the effects of this manipulation on other aspects of chamber calibration.
A7.7.3	A-13	More description is needed to explain how visual observation of the dye experiments in the exposure chambers will address questions 2-6 of A7.3.2 Chamber System Design study. How will gradients between porewater and overlying water be measured? Define what a dead space is and how big or small will have an effect on evaluation. What dyes will be used and could they affect the simulated geochemical conditions within the test chambers?
A7.7.3	A-13	The term "optimize" is used in the fifth bullet. Please describe the conditions or criteria that will be considered optimal when assessing the listed variables (i.e., sampling depth, sample volume, number of sampling ports/devices per chamber and suction strength of porewater)?
A7.7.3	-	A new appendix with SOPs, test methods, and test acceptability criteria for sturgeon bioassays would be extremely helpful for those not familiar with these test methods. Much of this information was presented at the January meeting. Please provide more details about the definitive tests in an appendix. Include some opening text to clarify that the tests described in the appendix will be performed pursuant to a different QAPP, and are provided within the Methods Development QAPP only to provide context for the reader.

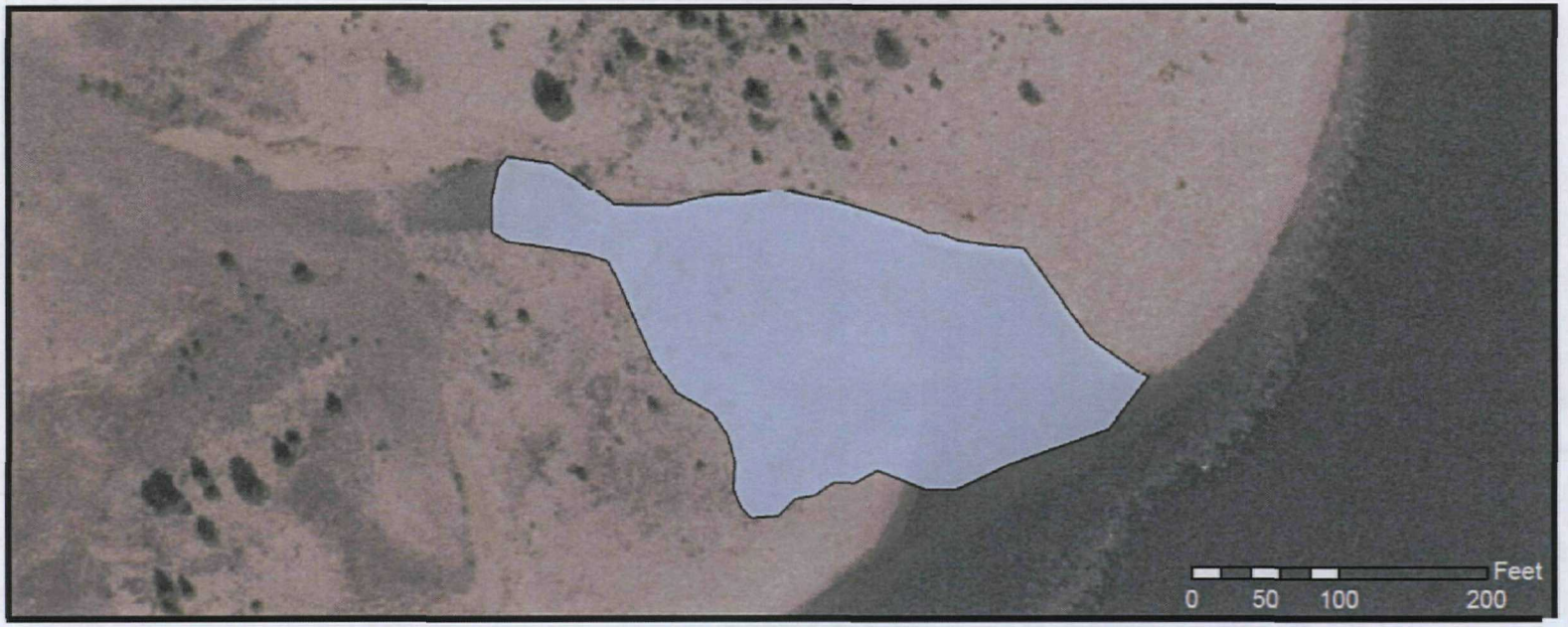
Section	Page	Comment
A7.7.3	-	Please include a table describing test conditions and acceptability criteria for the proposed design of the sturgeon slag studies (e.g., the last five slides from the Hecker January 2010 presentation in Seattle). This comment may be adequately addressed by EPA's request to add a new appendix with the SOPs for the definitive tests.
A9.2	A-14	Please list and describe all measurements that will inform the calibration of the sturgeon bioassay system, as is done for the off-site sample collection and bioassays. What are the quality control/quality assurance procedures included in this testing, and how will analytical bias and variability be assessed so differences that are reported can be attributed to testing conditions?
A9.2.1	A-14	It is confusing to find this brief discussion of the calibration of the sturgeon bioassay system in a section for measurement of off-site sediment parameters, when it was thought that sturgeon calibrations would be done with on-site sediments. Also note that the reference to section A7.7.3 is not helpful in clarifying sturgeon calibration measurements because only 'basic water quality' is stated in the referenced text. Please clarify this text.

Section B – Assessment and Oversight

Section	Page	Comment
-	-	This section does not describe the process for reporting these results to EPA, possible EPA oversight during methods development, or the process for identifying the most appropriate test methods for future testing based on the results from method development evaluations performed under this QAPP. Please include descriptions of how these processes will occur.

ATTACHMENT 2 – REVISED SAMPLING LOCATION

Sampling for the sturgeon methods development work in the U.S. will be conducted from within a polygon at Deadman's Eddy. The sampling area / polygon (see figure below) is currently under cultural resources review. Please note that page 3-1 of the Cultural Resources Coordination Plan will need to be revised to reflect the revised sampling location, the use of shovel(s) for sample collection, and other revisions, as appropriate. Samples may be collected from a depth of up to 12 inches.



ATTACHMENT 3 – EXAMPLE OF FURTHER DETAIL DESCRIBING DQOs

DQOs are qualitative and quantitative statements developed using the DQO Process that: 1) Clarify the study objectives and intended use of the data; 2) Define the type of data needed to support the decision; 3) Identify the conditions under which the data should be collected; and, 4) Specify tolerable limits on the probability of making a decision error due to uncertainty in the data (USEPA 2006).

Not all of the steps of the DQO process are applicable to methods development work, but the DQOs in the methods development work, must, at a minimum, include:

1) A clearly stated question;
2) A description of what tests or measures will be used to answer the question;
3) An explanation of how the results will be evaluated; and
4) A statement of how "success" will be judged; what is the preferred test outcome.

The following examples are intended to portray the level of detail that Teck should provide in the revised Sturgeon Sediment Toxicity Studies Method Development QAPP to describe their DQOs. This level of detail should be provided for all of the key questions that are introduced in Section A7.3.2 and further developed in Section A7.7.3. Please note -- these examples are entirely fictitious and are not intended to indicate real test conditions. We are not directing Teck to verbatim apply any of the detailed language below; it is merely provided as an example.

DQO Example 1 - Evaluate and establish homogenous flow conditions through alterations in chamber design (uniform distribution of influx; posterior chamber, etc.), and minimize "dead spaces" at inflow and outflow by means of dye tests.

This question will be answered by building and testing six chambers to see what design works best. Variables that will be tested include:

- The number and placement of inflow ports to the exposure chamber. A chamber with nine ports will be used to test the effects of changing the number of ports and the location of ports relative to the bottom and the sides of the tank. The tank will be filled with water containing dye. The system will be run using only the bottom three ports, only to top three, only the middle three, and only the one center port. Clean water will be pushed into the chambers through the selected ports, and mixing within the tank will assessed visually by watching for pockets of dye that may be left in the corners of the tank or in front of the fine mesh particle screen that divides the exposure chamber from the posterior chamber. The movement of dyed water will also be observed for the presence of back-flow areas or eddies. The optimal design will be the one that minimizes dead spaces and eddies while supporting flows through the tank that range between X and Y cfs.

- The location of the fine mesh particle screen. Three tanks will be built to aid in the final placement of the fine mesh particle screen. In one tank, the screen will be

6 inches from the end of the tank that drains to the reservoir. In the second tank, the screen will be 12 inches from the end to the tank, and the third tank will employ a distance of 18 inches. The goal is to maximize the size of the exposure area available to fish, and the optimal design will be the smallest posterior chamber that does not cause pockets of dye to accumulate and supports a flows through the tank between X and Y cfs.

DQO Example 2 - Identify the effect of different volumes and distribution of gravel on hydrological conditions in fluvial chambers

Newly hatched sturgeon have shown a strong preference for coarse gravel substrate, behind which they can "hide" (Hecker 2008 data, unpublished or other citation if there is one). Therefore, a single layer of gravel will be placed on top of the sediment in the exposure chambers. Different volumes and distribution of gravel will be tested to optimize the design of this gravel surface feature. This will be done by setting up several different tanks with varying amounts of gravel and different gravel placement techniques, and running the system to see how the gravel affects the movement of dyed water through the chamber. The test tanks will be filled with dyed water, and then clean water will be introduced through the inflow ports. The tanks will be observed visually to look for pockets of collected dye. The optimal design will be one that provides "hiding" habitat for the fish, while ensuring direct exposure to test sediments of interest in the tanks and minimizing dead spaces. Variables that will be tested include:

- The total volume of gravel per tank. Three volumes will be tested, including 100 milliliters, 500 milliliters, and 1 liter.

- The size of the gravel particles. Three sizes will be tested, ranging from marble-size to golf-ball size particles.

- The placement of gravel within the tank. The gravel will be placed evenly across the tank, or in small piles or clumps.